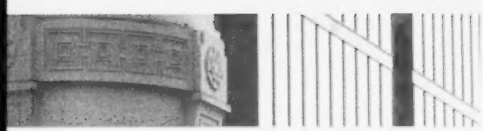
BANK OF CANADA
BANQUE DU CANADA

Bank of Canada Review

Winter 2012–2013



Articles

The G-20 Framework for Strong, Sustainable and Balanced Growth: Macroeconomic Coordination Since the Crisis 1
Robert Lavigne and Subrata Sarker

The U.S. Recovery from the Great Recession: A Story of Debt and Deleveraging 13
Brady Lavender and Nicolas Parent

Conference Summary: Financial Intermediation and Vulnerabilities 27
Jason Allen, James Chapman and Ian Christensen

Members of the Editorial Board

Chair: Allan Crawford

David Beers
Paul Chilcott
Don Coletti
Agathe Côté
Gerry Gaetz
Donna Howard
Sharon Kozicki
Timothy Lane
Tiff Macklem
Ron Morrow
John Murray
Sheila Niven
Lawrence Schembri
Evan Siddall
Ianthi Vayid
Carolyn Wilkins
David Wolf

Editor: Alison Arnot

The *Bank of Canada Review* is published four times a year. Articles undergo a thorough review process. The views expressed in the articles are those of the authors and do not necessarily reflect the views of the Bank.

The contents of the *Review* may be reproduced or quoted, provided that the publication, with its date, is specifically cited as the source.

For further information, contact:

Public Information
Communications Department
Bank of Canada
Ottawa, Ontario, Canada K1A 0G9

Telephone: **613 782-8111**; **1 800 303-1282** (toll free in North America)
Email: **info@bankofcanada.ca**
Website: **bankofcanada.ca**

ISSN 1483-8303
© Bank of Canada 2013

The G-20 Framework for Strong, Sustainable and Balanced Growth: Macroeconomic Coordination Since the Crisis

Robert Lavigne and Subrata Sarker, International Economic Analysis

- Since the 2008 global financial crisis, there have been an increasing number of calls for greater macroeconomic policy coordination among the world's largest economies. The Framework for Strong, Sustainable and Balanced Growth, launched at the G-20's Pittsburgh Summit in September 2009, has provided a mechanism for such co-operation.
- The Framework has achieved some successes: advanced economies have agreed to objectives for fiscal consolidation, and a broad structure for policy coordination has been institutionalized. The Framework has also played a role in promoting the agenda for global financial sector reform, which has proceeded well under the aegis of the Financial Stability Board.
- However, world growth has remained weak in the years following the crisis, and there has not yet been a sustainable rebalancing of global demand. Progress has been slow in terms of developing credible medium-term fiscal plans in some advanced countries and increasing exchange rate flexibility in certain emerging economies.
- The challenge will be to augment the Framework's influence over G-20 policies, notably by enhancing the analysis of international policy spill-overs and strengthening the peer-review process.

In response to increasing evidence of international spillover effects since the 2008 global financial crisis, calls by governments, academics and the public for greater policy coordination among the world's largest economies have intensified. The Group of 20 (G-20), now the main forum for international economic policy coordination, has responded along several fronts. Notably, it accelerated the program for global financial sector reform, strengthened the International Monetary Fund (IMF) and increased macroeconomic policy coordination among its members. This article reviews the G-20's macroeconomic policy coordination efforts, focusing on its Framework for Strong, Sustainable and Balanced Growth (the Framework), which members launched in the wake of the crisis.

The *Bank of Canada Review* is published four times a year. Articles undergo a thorough review process. The views expressed in the articles are those of the authors and do not necessarily reflect the views of the Bank. The contents of the *Review* may be reproduced or quoted, provided that the publication, with its date, is specifically cited as the source.

The renewed attempt at macroeconomic coordination represents a clear change in attitudes among policy-makers. The pre-crisis view was that, while coordination could provide some economic benefits, they would likely be small and difficult to attain, and thus probably not worth the effort. Moreover, past experience seemed to suggest that successful policy coordination would need to focus on technical issues, within a restricted group of like-minded countries (such as the members of the G-7), and aim to preserve existing policy regimes (Eichengreen 2011). Yet inaction was no longer an option. The financial crisis highlighted that just as global economic linkages had grown exponentially, so too had the international spillover effects of domestic policies (IMF 2012b). In addition, the costs of continuing the pre-crisis policies were potentially quite significant (Murray 2011). Given the stakes, and despite the mixed history of such initiatives, the G-20 launched the Framework at its Pittsburgh Summit in September 2009, embarking on the most comprehensive attempt at macroeconomic coordination since the creation of the Bretton Woods regime.

The objective of the Framework is to help achieve a strong, sustainable and balanced global economic recovery. This outcome requires a pickup in demand growth in surplus countries to offset the weakness in deficit countries arising from significant public sector and private sector deleveraging. Appropriately paced fiscal consolidation, greater exchange rate flexibility and accelerated structural reforms are needed to achieve this rotation of demand in a context of robust global growth. The Framework seeks to align G-20 policies in support of these goals, strengthening the nascent global recovery in the short run and laying the foundations for robust economic growth over the medium term.

◀ *Strong, sustainable and balanced growth requires a pickup in surplus country demand to offset the weakness in deficit countries arising from significant public sector and private sector deleveraging*

The Origins of the Framework

The design and implementation strategy underlying the G-20 Framework draw on lessons learned from two recent policy coordination initiatives: the IMF's multilateral consultations in 2006 and the G-20's response in early 2009 to the financial crisis.

In June 2006, the IMF launched its first multilateral consultations with five systemically important economies (the United States, the euro area, China, Japan and Saudi Arabia). The objective was to reduce global current account imbalances (IMF 2007). The process was led by the IMF, and political ownership was limited (Blustein 2012). While the joint plans that were laid out were similar to those in the G-20 Framework, countries were unwilling to publicly commit to them, there was no formal tracking of their implementation and the process suffered from a lack of transparency. In the end, the multilateral consultations failed to translate into effective policy action.

The environment for co-operation changed dramatically two years later. Following the collapse of Lehman Brothers in September 2008, policy-makers were able to demonstrate the feasibility and usefulness of policy coordination. Major central banks quickly extended and expanded foreign currency liquidity swap lines[1] to counter widespread U.S.-dollar shortages, and implemented synchronous interest rate cuts in October 2008 in response to the global shock. Buoyed by the success of this joint policy action and

1 Swap lines involved temporary reciprocal currency arrangements between the Federal Reserve and a number of foreign central banks. Two types of swap lines were established: dollar liquidity lines and foreign-currency liquidity lines. For more details, see www.federalreserve.gov/monetarypolicy/bst_liquidityswaps.htm.

additional commitments made by the G-7,[2] the G-20 came forward at its London Summit in April 2009 with a number of initiatives designed to calm financial markets and re-establish confidence in global policy-making.[3] Initiatives included a dramatic augmentation of the IMF's resources, a concerted push for global financial sector reform and, more generally, a clear commitment that the G-20 was ready to respond as required. A key element was concerted fiscal stimulus: the total amount of stimulus from the G-20 members in 2009 was close to 1.4 per cent of their aggregate GDP, although countries varied widely in terms of the size, speed and composition of measures (Prasad and Sorkin 2009).[4]

Key Features of the Framework

G-20 policy-makers took note of the lessons learned from the two earlier coordination efforts when designing the key features of the Framework, described below:

- **Political ownership.** The Framework is a country-led process, closely linked to political decision-makers. Country commitments are formalized in a G-20 Action Plan presented at Leaders' annual summits. Canada and India co-chair the Framework Working Group, which carries out the background work leading up to the summits.[5] Unlike the multilateral consultations in 2006, the IMF does not play a coordinating role, but instead provides technical assistance to the G-20 as required.
- **Enhanced accountability.** The G-20 leaders established the Mutual Assessment Process (MAP) to monitor and support the implementation of country commitments. Recognizing that the Framework relies solely on peer pressure and disclosure as disciplining mechanisms, the MAP was designed to ensure a candid and productive discussion of progress toward fulfilling policy commitments. In 2012, members agreed to enhance the MAP's accountability framework.[6]
- **Broad scope.** Unlike the multilateral consultations, the thrust of the Framework is not exclusively on reducing external imbalances; instead, it focuses more fundamentally on putting the global economy on a sound footing. The Framework has both a "near-term" and a "medium-term" focus, working to mitigate risks and stabilize growth in the short run, while also laying the foundations for durable growth over the medium term. The objectives are inclusive enough to involve a diverse set of countries in a wide range of policies.

◂ *The Mutual Assessment Process was designed to ensure a candid and productive discussion of progress toward fulfilling policy commitments*

2 The G-7 Plan of Action in October 2008 stated that "the current situation calls for urgent and exceptional action," including using "all available tools to support systemically important financial institutions and prevent their failure." For details, see www.fin.gc.ca/activty/g7/g7101008-eng.asp.

3 For more details, see the G-20 London Summit Leaders' Statement (3 April 2009) at www.canadainternational.gc.ca/g20/summit-sommet/g20/declaration_010209.aspx?view=d.

4 The scale of this measure was not far from what the IMF had advised: toward the end of 2008, it called for a fiscal stimulus equal to 2 per cent of global GDP. See "Financial Crisis Response" at www.imf.org/external/pubs/ft/survey/so/2008/INT122908A.htm.

5 The Department of Finance is the co-chair of the G-20 Framework Working Group. The Bank of Canada also represents Canada.

6 The G-20 accountability framework has evolved through several stages. Work on developing indicators to enhance accountability began in 2011, when members agreed on "indicative guidelines" to identify vulnerabilities and imbalances in the G-20. The methodology identified seven systemically important countries that the IMF then examined in a series of country-specific "sustainability" reports. In 2012, countries formally agreed to a set of indicators to monitor and assess progress in the areas of fiscal, monetary and exchange rate policies.

- **Action Plan commitments.** Each of the G-20 countries has identified policy commitments that they are integrating into their national economic plans. The following are the core G-20 commitments as they evolved through the Action Plans of Seoul (2010), Cannes (2011) and Los Cabos (2012):
  - **Fiscal consolidation to ensure debt sustainability in advanced economies.** At the Toronto Summit in June 2010, G-20 advanced economies set specific fiscal targets: cutting 2010 deficits in half by 2013, and stabilizing or lowering debt-to-GDP ratios by 2016.
  - **Greater exchange rate flexibility.** G-20 members with current account surpluses pledged to "enhance exchange rate flexibility to reflect underlying economic fundamentals"[7] and move more rapidly toward market-determined exchange rate systems. China, in particular, promised at the Cannes Summit in 2011 to reinforce its medium-term rebalancing toward domestic consumption with "ongoing measures to promote greater exchange rate flexibility to better reflect underlying economic fundamentals, and gradually reduce the pace of accumulation of foreign reserves."[8]
  - **Structural reforms in all countries.** In advanced economies, commitments consisted of ongoing reforms to the global financial sector, coordinated by the Financial Stability Board (FSB), as well as labour and product market reforms. In surplus emerging-market economies (EMEs), reforms focused on reducing excessive savings and unlocking domestically driven economic growth.

Assessing the Framework

This section examines the G-20's progress in implementing the Framework against three benchmarks: (i) achieving the objectives of strong, sustainable and balanced growth; (ii) implementing fiscal policy commitments; and (iii) meeting commitments on exchange rate policy.[9] We end this section with an assessment of the Framework mechanism itself, abstracting from actual coordination outcomes. While other aspects of the Framework, such as structural reforms, are also deserving of macroeconomic analysis, their progress is difficult to assess in the short run or compare across countries.[10] A notable exception has been FSB-led efforts to reform the global financial system, where significant progress has been made in developing new minimum global standards to address the key regulatory weaknesses exposed by the financial crisis. The crucial next phase of this reform process is consistent, timely and full implementation of these standards at the national level by G-20 members (Carney 2012b).

---

7 See the G-20 Toronto Summit Declaration at www.canadainternational.gc.ca/g20/summit-sommet/2010/toronto-declaration-toronto.aspx?lang=eng&view=d.

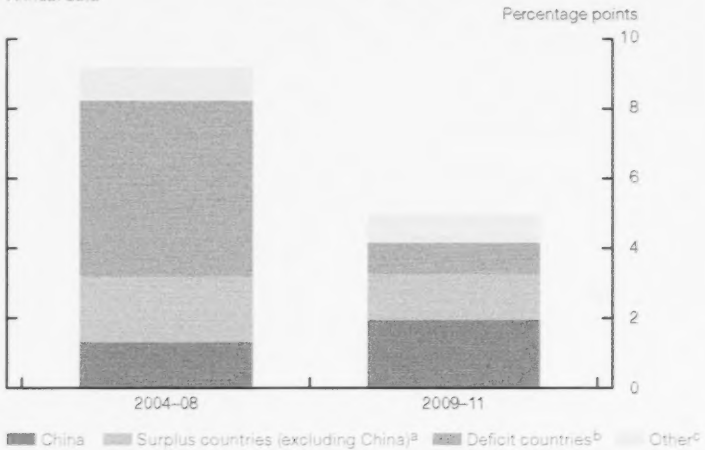
8 See the G-20 Cannes Action Plan for Growth and Jobs at www.canadainternational.gc.ca/g20/summit-sommet/2011/cannes.aspx?menu_id=72.

9 Our assessment complements Murray (2012), which provides a recent comprehensive overview of the Framework process from the perspective of a policy-maker.

10 An ongoing challenge for the MAP is to clarify which structural reforms will have the greatest impact on global economic growth and to establish an effective means of assessing their implementation. The Organisation for Economic Co-operation and Development (OECD) is providing significant assistance to the G-20 in this respect.

Chart 1: **Contribution to G-20 nominal domestic demand growth by region**

Annual data



Note: a. Surplus countries (excluding China) are Argentina, Germany, Indonesia, Japan, Russia and South Korea.
b. Deficit countries are Australia, France, India, Italy, Mexico, South Africa, Spain, Turkey, the United Kingdom and the United States.
c. Other countries are Brazil and Canada.

Sources: National statistical databases

Has strong, sustainable and balanced growth been achieved?

Four years after the crisis, there has not been a strong recovery and global output remains well below its potential level

Four years after the crisis, there has not been a strong recovery and global output remains well below its potential level. While recoveries following a financial crisis are often slow and protracted (Reinhart and Rogoff 2009), policy is not powerless. An appropriate mix of policies could facilitate the global recovery.

Chart 1 shows the average contribution to the growth of G-20 nominal domestic demand by surplus, deficit and "other"[11] countries during the pre-crisis (2004–08) and post-crisis (2009–11) periods. The growth rate of total G-20 demand has fallen sharply in the post-crisis period, driven mostly by the severe slowdown in deficit economies, while aggregate growth in surplus economies has remained virtually unchanged. Any decline in global current account imbalances has mainly been the result of cyclical factors.[12]

The G-20 countries at the epicentre of the 2008 crisis (the United States and the United Kingdom) and the euro-area crisis (Spain and Italy) are the sources of most of the contraction in G-20 demand. Among surplus economies, domestic demand growth has increased in China since the pre-crisis period, while it has fallen, in aggregate, in others. Overall, global growth has been neither strong nor balanced.

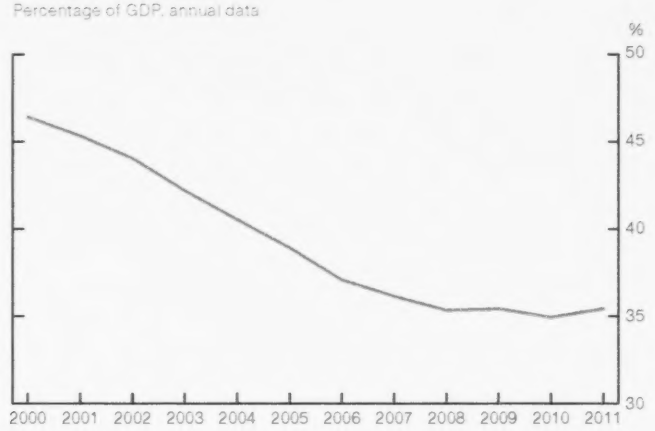
The economic outlook also remains challenging as formidable headwinds in the form of private sector and public sector deleveraging and heightened uncertainty continue to weigh on domestic demand in advanced economies. There is also good reason to be concerned about the sustainability

11 Only those countries that have been consistently in surplus or deficit before and after the crisis are categorized as "surplus" or "deficit" countries. The remainder are categorized as "other." The sample does not include Saudi Arabia because data were not available. Spain is included since it is a permanent invitee in the Framework process and makes commitments in line with the G-20 Action Plans.

12 In other words, the recent reduction in global current account imbalances is not due to a surge in imports by EMEs, but to a severe decline in exports to advanced economies and in trade flows more generally.

Chart 2: **China's consumption**

Percentage of GDP, annual data



Source: National statistical database Last observation: 2011

of domestic demand growth in some EMEs. For example, the pace of economic activity in China since the crisis has been heavily dependent on rapid growth in investment spending, which now accounts for almost one-half of Chinese GDP. Investment has been boosted by strong increases in productive capacity in the export-oriented manufacturing sector, a surge in spending on public infrastructure and a booming housing sector. Meanwhile, consumption as a share of GDP has continued to fall, reaching 35 per cent in 2011 (**Chart 2**), which is well below that of other EMEs, even after controlling for different stages of economic development.

Have countries implemented their fiscal policy commitments?

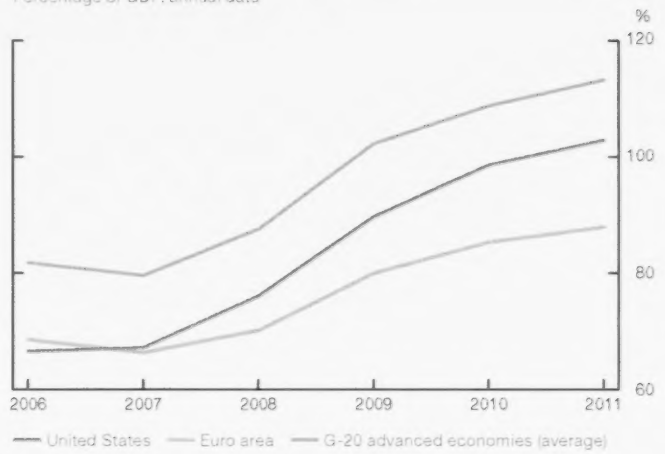
Most advanced economies are on track to meet the fiscal commitments established at the Toronto Summit (IMF 2012a). Notable exceptions are the United States and Spain,[13] which are unlikely to cut their 2010 deficit levels in half by 2013. The November 2012 communiqué of the meeting of G-20 finance ministers and central bank governors recognized that the United States should calibrate the pace of its fiscal tightening in a way that ensured public finances were placed on a sustainable long-run path while avoiding a sharp fiscal contraction (the "fiscal cliff") in 2013. More generally, advanced economies are now focusing their commitments on medium-term debt stabilization, with countries agreeing to specify by the 2013 Summit a credible medium-term path for their debt-to-GDP ratios, accompanied by clear strategies and timetables to achieve them. Debt stabilization will require robust consolidation efforts by many advanced economies, given the elevated levels of their public debts (**Chart 3**).

Ultimately, it is difficult to quantify the extent to which the Framework has influenced budgetary policies. The crisis in the euro area has forced rapid consolidation on many economies. Of the countries that have not experienced severe market pressure to consolidate, the United Kingdom and Canada have largely complied with their commitments. In contrast, neither the United States nor Japan has yet established credible medium-term fiscal plans.

13 Japan, which is by far the most domestically indebted G-20 country, did not commit to the Toronto targets.

Chart 3: **General government gross debt in advanced economies**

Percentage of GDP, annual data



Sources: International Monetary Fund, *World Economic Outlook* (October 2012) and *Fiscal Monitor* (October 2012)

Last observation: 2011

There is a growing awareness that a date-based target like the Toronto agreement may not be flexible enough to deal with changing economic conditions and country-specific circumstances. As a result, there are increasing calls for an amended G-20 fiscal agreement, one that solidly anchors long-term commitments but affords greater short-run flexibility.

There are calls for a G-20 fiscal agreement that solidly anchors long-term commitments but affords greater short-run flexibility

Have countries met their exchange rate commitments?

If implementation of the G-20 fiscal commitments can been characterized, in some cases, by rapid short-term consolidation and a shortage of well-articulated longer-term plans, the response to the exchange rate commitments can be described as the opposite: limited short-term increases in flexibility, but significant promises regarding future developments.

Chart 4 plots monthly reserves-to-GDP ratios against real exchange rates in EMEs over time. Horizontal movement on the chart captures reserve accumulation, while vertical movement captures exchange rate appreciation.

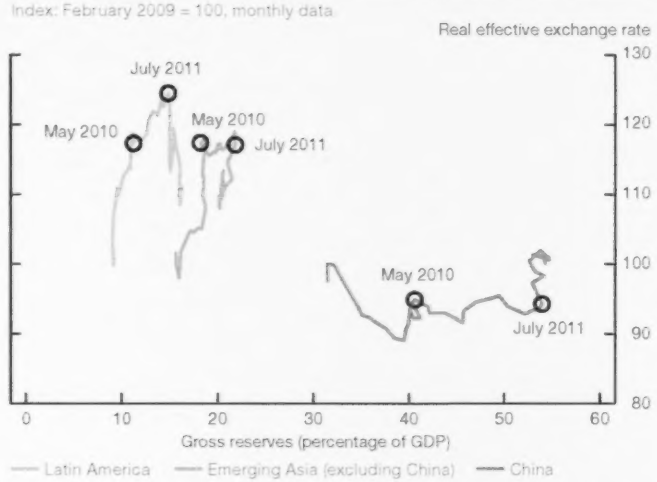
While the real exchange rates of Latin American and most Asian EMEs (excluding China) strengthened considerably in the initial stages of the recovery, appreciation slowed in mid-2010, owing to more active foreign exchange intervention and tighter capital controls. Most EME currencies started to depreciate in mid-2011 when the euro-area crisis intensified.

China has followed a different path, using large and sustained sterilized intervention to prevent or slow the appreciation of its real exchange rate over much of the period. In mid-2011, the trend changed, with the downturn in both global exports and capital inflows requiring less reserve accumulation, and the increased flexibility of the Chinese exchange rate regime allowing for greater appreciation of its real effective exchange rate.[14]

14 The daily bands around the yuan/dollar bilateral exchange rate were widened from 0.5 per cent to 1 per cent in April 2012.

Chart 4: Real exchange rates and reserves in emerging-market economies

Index: February 2009 = 100, monthly data



Note: Latin America refers to Argentina, Brazil and Mexico. Emerging Asia (excluding China) refers to India, Indonesia and Korea. Countries are weighted using 2011 GDP in purchasing-power-parity (PPP) terms.

Sources: Bank for International Settlements and national statistical databases

Last observations: China, September 2012; all others, October 2012

Exchange rate policies are an important part of the Framework. Greater exchange rate flexibility is essential to allow market-driven exchange rate appreciation (depreciation) in surplus (deficit) economies. Such moves would encourage shifts in relative prices and favour a rebalancing of global demand toward greater domestic absorption in surplus nations and stronger net exports in deficit countries. There have been conflicting views, however, among EMEs and advanced economies concerning the need for greater exchange rate flexibility. Many EMEs believe that excessively loose monetary policies in advanced economies, particularly in the form of quantitative easing, have caused a "wall of capital" to hit them, necessitating the use of capital controls and active foreign exchange intervention to protect their economies.[15] Most advanced economies have argued that excessive inflows would recede if EME currencies were more flexible, and that what little impact quantitative easing had on capital flows, and thereby on export competitiveness through currency appreciation, was more than offset by the positive trade and confidence spillovers from appropriate expansionary monetary policies in advanced economies (Bernanke 2012).

◀ *Greater exchange rate flexibility is essential to rebalance global demand toward greater domestic absorption in surplus nations and stronger net exports in deficit countries*

There may also be a burden-sharing issue. It is not surprising that the G-20 has seen only modest progress on exchange rate commitments. Historically, this has been a very difficult area for coordination, because, at least in the short run, exchange rate adjustment is perceived by some to be a zero-sum game, where one country's gain in competitiveness is another's loss. However, a more complete analysis overturns this perception, since exchange rate adjustment is ultimately beneficial for all countries (it is a "win-win" game). Indeed, many costs associated with delayed real appreciation are often not adequately considered. For instance, sterilized intervention to resist appreciation in real exchange rates often leads to domestic imbalances and distortions (such as an unsustainable composition of demand

15 EMEs essentially argue that loose monetary policies and quantitative easing have led global investors to "search for yield" in more risky investments, such as EME assets or commodities. The resulting large capital inflows into EMEs, which could lead to overheating pressures and/or speculative bubbles, would be subject to rapid reversals once perceptions of global risk changed.

and financial sector distortions). Moreover, exchange rate flexibility helps to achieve the appropriate adjustments without forcing difficult changes in the overall levels of domestic wages, prices and output (Friedman 1953; Carney 2012a). Delayed exchange rate flexibility may also induce other countries to adopt more expansive polices than would otherwise be the case, possibly entailing considerable spillovers and risks.

Although the G-20 has had limited overall success with the Framework's exchange rate commitments, certain developments have been encouraging. China has made a modest move toward increased exchange rate flexibility and there has been a decline in reserve accumulation in some countries. However, the extent to which such developments reflect significant structural shifts in policy, rather than merely cyclical factors, is not yet clear.

Institutionalizing a mechanism for policy coordination

The Framework's main contribution is the institutionalization of a process for global macroeconomic policy coordination

When assessing the Framework, it is important to differentiate actual coordination outcomes from the quality of the coordinating mechanism. The Framework's main contribution is the institutionalization of a process for global macroeconomic policy coordination, which has several important benefits. First, the Framework has provided a formal and multilateral channel for G-20 countries to share, and possibly adjust, their policy plans. The MAP enables member policy-makers to candidly voice concerns, pose questions and provide explanations about their policies. Importantly, the Framework allows members to discuss longer-term systemic issues that may not be easy to address in other international forums that focus primarily on current issues.

Second, the G-20 Framework process increases policy transparency in all countries. By providing more accessible information on policy commitments and medium-term global economic projections, the Framework can be used to harness market discipline to create incentives for co-operation.

Finally, the value of the Framework lies less in arranging the details of coordination (these will be determined by circumstances) than in ensuring implementation over time, once the urgency that initially drove coordination has passed. By providing the means of assessing sustained co-operation through the MAP, the Framework has made medium-term coordination both credible and feasible.

Improving the Framework

Room for improvement nevertheless remains in the actual design of the Framework. This section identifies two major areas—spillover analysis and peer review.

Better spillover analysis

One way to motivate policy coordination is to clarify the costs of failed or delayed policy implementation. The current lack of co-operation on exchange rates may stem from the common perception that the costs to the domestic economy of not co-operating are low, especially for the larger G-20 nations. This could change, however, if the international spillover effects of domestic policies are greater than the G-20 collectively perceives them to be, as simulations by de Resende et al. (2012) suggest. A better appreciation of these spillover effects may cause countries to be more willing to absorb some short-term costs to prevent a worse outcome over the medium term. Moreover, greater focus on "non-co-operative" or

"downside" scenarios would better reveal the opportunity cost of failed policy implementation. To its credit, the IMF has applied the latest in modelling technology to measure the effects of increased co-operation on global outcomes. Nevertheless, spillover analysis is in its infancy and recent research by the IMF suggests that cross-border spillovers could be underestimated (IMF 2012b).

Effectively informing members of the costs of inaction may require a somewhat more assertive role for the IMF. While it cannot take on the coordinating role it had attempted to assume in the 2006 Multilateral Consultations, the IMF can work proactively with the co-chairs of the Framework Working Group to stimulate discussion through thought-provoking analysis and assessments.

Stronger peer review

The current peer-review process is not functioning as well as it could. The G-20 is a heterogeneous group, with significant differences in views and priorities, making mutual assessment difficult.[16] To address this challenge, members agreed in 2012 to an enhanced accountability assessment process that would be country-owned and -led, based on the members' assessments and with the input of independent third-party evaluations. Members endorsed a rigorous "comply-or-explain" approach: if countries are off course in meeting their commitments, then authorities should explain the reasons for these developments and describe the measures they plan to take to get back on track. The full application of this "comply-or-explain" approach will be critical if the peer review is to function effectively.

◀ *The full application of the "comply-or-explain" approach will be critical if the peer review is to function effectively*

Several additional changes to the peer-review process would also enhance its efficiency:

- **Increased precision of commitments.** Current G-20 commitments are often not as clear as they could be in terms of the measures being proposed and the time horizons, and often lack clear benchmarks to track progress.
- **Increased focus on domestic demand.** Coordination of policies to promote sustainable domestic demand growth may help to avert the perceived burden-sharing problem. The G-20 should clearly outline how fiscal, monetary, exchange rate and structural reform policies can combine to sustainably revitalize domestic demand in member economies.
- **Increased exchange rate transparency.** The IMF could draw on its External Balance Assessment to produce regular reports for G-20 members on policy issues directly related to real exchange rate adjustment, such as foreign exchange intervention, changes in capital controls and sterilization policies. Countries could commit to report intervention activities in a timely manner and to clarify the parameters of their exchange rate regimes. Enhancing the transparency of exchange rate policies within the MAP is a firm yet non-accusatory way to increase pressure on countries to promote market-determined exchange rate flexibility.

16 For example, an OECD-style peer review of countries by a small number of members is unacceptable to many in the group.

Conclusion

The G-20 Framework is an ambitious undertaking that has achieved mixed results so far in terms of policy coordination. There have been some successes, including the Toronto commitment to ensure fiscal consolidation in advanced countries and broad agreement on a reasonable set of mutually consistent medium-term policies. However, it is clear that the Framework has yet to deliver strong, sustainable and balanced growth.

The challenge will be to enhance the Framework's influence over members' policies. Part of the solution lies in increasing the depth of spillover analysis and the effectiveness of the peer-review process. While such procedural changes are no guarantee of policy coordination, a more effective Framework would increase the chances of success.

Literature Cited

Bernanke, B. S. 2012. "U.S. Monetary Policy and International Implications." Speech given at the seminar on "Challenges of the Global Financial System: Risks and Governance Under Evolving Globalization," sponsored by the Bank of Japan and the International Monetary Fund, Tokyo, Japan, 14 October.

Blustein, P. 2012. "A Flop and A Debacle: Inside the IMF's Global Rebalancing Acts." Centre for International Governance Innovation Papers No. 4 (June).

Carney, M. 2012a. "Dutch Disease." Speech to the Spruce Meadows Round Table, Calgary, Alberta, 7 September.

———. 2012b. "Progress of Financial Regulatory Reforms." Letter from Financial Stability Board Chairman to G-20 Finance Ministers and Central Bank Governors, 31 October. Available at www.financialstabilityboard.org/publications/r_121105.pdf.

de Resende, C., C. Godbout, R. Lalonde, E. Morin and N. Perevalov. 2012. "On the Adjustment of the Global Economy." *Bank of Canada Review* (Spring): 1–15.

Eichengreen, B. 2011. "International Policy Coordination: The Long View." National Bureau of Economic Research Working Paper No. 17665.

Friedman, M. 1953. *Essays in Positive Economics*. Chicago: University of Chicago Press.

International Monetary Fund (IMF). 2007. "Staff Report on the Multilateral Consultation on Global Imbalances with China, the Euro Area, Japan, Saudi Arabia, and the United States." Available at www.imf.org/external/np/pp/2007/eng/062907.pdf.

———. 2012a. "Toward Lasting Stability and Growth: Umbrella Report for G-20 Mutual Assessment Process." Available at www.imf.org/external/np/g20/pdf/062012.pdf.

International Monetary Fund (IMF). 2012b. "2012 Spillover Report." (9 July). Available at www.imf.org/external/np/pp/eng/2012/070912.pdf.

Murray, J. 2011. "With a Little Help from Your Friends: The Virtues of Global Economic Coordination." Speech at the State University of New York, Plattsburgh, New York, 29 November.

———. 2012. "The Great Frustration: Hesitant Steps Toward Global Growth and Rebalancing." Speech to the New York Association for Business Economics, New York, New York, 27 November.

Prasad, E. and I. Sorkin. 2009. "Assessing the G-20 Stimulus Plans: A Deeper Look." Brookings Institution (March). Available at www.brookings.edu/research/articles/2009/03/g20-stimulus-prasad.

Reinhart, C. M. and K. S. Rogoff. 2009. *This Time Is Different: Eight Centuries of Financial Folly*. Princeton, NJ: Princeton University Press.

The U.S. Recovery from the Great Recession: A Story of Debt and Deleveraging

Brady Lavender and Nicolas Parent, International Economic Analysis

- The prolonged period of deficient demand in the United States following the Great Recession is unusual relative to past U.S. recessions, but is consistent with historical international experience in the aftermath of severe financial crises.
- Loose lending standards and relatively low interest rates in the pre-crisis period contributed to a sharp buildup in household debt. Subsequently, household deleveraging has been the most important factor holding back the recovery.
- While a large fiscal expansion helped to sustain aggregate demand during the crisis and its aftermath, the federal debt in the United States is currently on an unsustainable trajectory. The government sector now needs to delever, which will represent a drag on economic growth for years to come.
- Given Canada's close real and financial linkages with the United States, understanding the trajectory and characteristics of the U.S. recovery has important implications for the Canadian economy and thus monetary policy.

In December 2007, the U.S. economy entered its longest and deepest recession since the Great Depression. Historically, in the early stages of a recovery, U.S. GDP has typically grown at a faster rate than the potential growth rate of the economy, reflecting pent-up demand from businesses and consumers and some rebuilding of inventories. Deep economic downturns thus tend to be associated with stronger rebounds (Howard, Martin and Wilson 2011). However, the current recovery has been the weakest U.S. recovery in the postwar era. More than three years after the end of the recession, unemployment remains elevated and gross domestic product (GDP) per capita is still below its pre-recession levels.[1]

Although the recovery from the 2007–09 recession is unusual relative to past U.S. recessions, the prolonged period of deficient demand in the United States is consistent with international historical experience in the aftermath

1 This article contains information up to the end of January 2013.

The *Bank of Canada Review* is published four times a year. Articles undergo a thorough review process. The views expressed in the articles are those of the authors and do not necessarily reflect the views of the Bank. The contents of the *Review* may be reproduced or quoted, provided that the publication, with its date, is specifically cited as the source.

of severe financial crises. Following such crises, most economies have a period of sluggish growth as households, firms and governments reduce their debt loads (IMF 2012; Reinhart and Rogoff 2008). This is particularly true when severe financial crises are associated with housing booms and busts.

In this article, we explore the reasons why the U.S. recovery has been particularly slow relative to all other postwar-era recoveries in the United States. While U.S. fiscal policy uncertainty, global imbalances and the ongoing European debt crisis have all restrained the recovery, the primary story is one of debt and deleveraging. In the years leading up to the crisis, an easing of lending standards and relatively low long-term interest rates contributed to a sharp buildup in household debt. Subsequently, unsustainable household spending and debt levels combined with a considerable drop in asset prices left consumers in a vulnerable position, making balance-sheet repair a necessity. While a large fiscal expansion in the public sector helped to sustain aggregate demand in the face of private deleveraging, further restraint will take place in coming years as the government sector reduces its deficit to return public debt levels to a sustainable path.

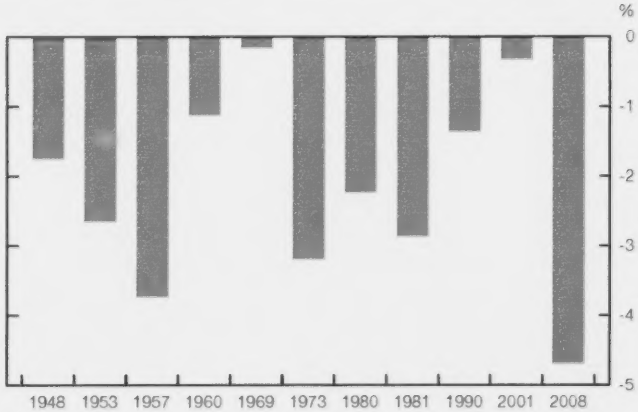
Consistent with the weak U.S. recovery, more than three years after the end of the recession, Canadian exports remain 9 per cent below their pre-recession peak. Given Canada's close real and financial linkages with the United States, understanding the trajectory and characteristics of the U.S. recovery has important implications for the Canadian economy and thus monetary policy.

Understanding the trajectory and characteristics of the U.S. recovery has important implications for the Canadian economy and thus monetary policy

The Great Recession: Deep and Prolonged

The Great Recession in the United States started in December 2007 and lasted for 18 months. Over that period, U.S. real GDP fell by 4.7 per cent, making the recession the longest and deepest since the Great Depression (**Chart 1**).[2] U.S. residential investment plunged by almost 60 per cent from its peak in the fourth quarter of 2005 to its trough in early 2011; as a share of GDP, it dropped from 6.3 per cent in the fourth quarter of 2005 to only

Chart 1: **Decline in real GDP, peak to trough, during postwar recessions in the United States**

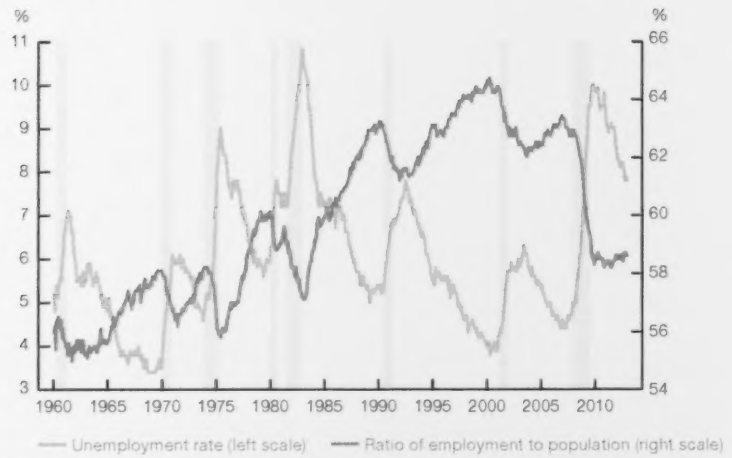


Note: The peak for the most recent recession was 2007Q4, and the trough was 2009Q2.
Source: U.S. Bureau of Economic Analysis

2 Largely owing to strong linkages with the United States, Canada's GDP fell by 4.2 per cent, despite the absence of domestic deleveraging.

Chart 2: U.S. unemployment rate and the ratio of employment to population

Monthly data



Note: The shaded areas indicate recession periods.

Source: U.S. Bureau of Labor Statistics

Last observation: December 2012

2.3 per cent in late 2011. Consumer spending, exports and business investment also fell sharply during the recession, with the latter declining by 24 per cent from its previous high.

The Great Recession resulted in the loss of over 8.5 million jobs, sending the unemployment rate to 10 per cent (**Chart 2**).[3] When all marginally attached workers and those who work part time for economic reasons are included, the broader measure of the unemployment rate surged to 17 per cent, an unprecedented level for the postwar era.

Despite the severity of the recession, the recovery and following expansion were disappointingly slow relative to other U.S. recoveries, but were in line with the Big Five modern financial crises experienced elsewhere (**Chart 3**).[4] Growth in GDP has averaged only a little more than 2 per cent per year since the end of the recession and U.S. per capita GDP has yet to recover its pre-recession level.[5] The ratio of employment to population, which fell to its lowest level since 1983, has shown minimal improvement since its trough in 2010. Moreover, long-term unemployment remains a significant concern. In December 2012, almost 40 per cent of the 12.2 million unemployed had been looking for work for more than 26 weeks. Although the current episode has been the weakest of postwar-era U.S. recoveries, a comparison with the Great Depression shows that the situation could have been much worse. An extraordinary coordinated policy response, both from monetary and fiscal authorities, prevented a much deeper recession (Kozicki, Santor and Suchanek 2011).

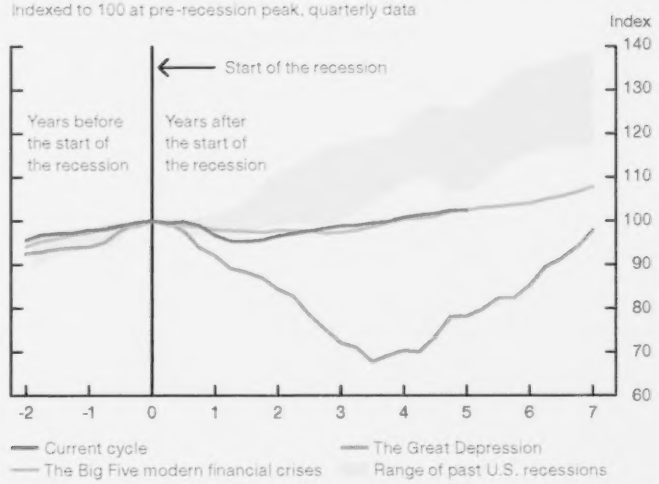
3 Cuts to private sector employment were relatively broad based; however, the construction industry was hit particularly hard because of the decline in the housing market.

4 The Big Five financial crises, as discussed in Reinhart and Rogoff (2008), are Spain (1977), Norway (1987), Finland (1991), Sweden (1991) and Japan (1992).

5 In the January 2013 *Monetary Policy Report*, the Bank of Canada projects that the U.S. recovery will take about 5 years from the trough of the recession to reach its pre-crisis level (on a GDP per capita basis). An examination of previous U.S. systemic financial crises shows that GDP per capita returned to its pre-recession peak 5 to 11 years after the crisis (Reinhart and Rogoff 2012). The dates of these system-wide financial crises in the United States are 1873 (5 years), 1892 (5 years), 1907 (6 years) and 1929 (11 years).

Chart 3: Real GDP compared with the Big Five financial crises and the Great Depression

Indexed to 100 at pre-recession peak, quarterly data



Note: The Big Five modern financial crises, as decribed in Reinhart and Rogoff (2008), are Spain (1977), Norway (1987), Finland (1991), Sweden (1991) and Japan (1992).

Sources: U.S. Bureau of Economic Analysis, Organisation for Economic Co-operation and Development, Gordon and Krenn (2010), and Bank of Canada calculations

Last observation: 2012Q4

One of the biggest differences between the current and past economic recoveries in the United States is the behaviour of the household sector. Personal consumption and residential investment grew more slowly following the Great Recession than in any other postwar recovery in the United States (**Chart 4** and **Chart 5**). Since household spending represents close to 70 per cent of U.S. GDP, weak growth in this sector has largely determined the path of the overall economic recovery.[6] In the fourth quarter of 2012, real U.S. GDP was US$1.9 trillion below the level that would be consistent with the average path of past U.S. recessions, with US$1.3 trillion attributable to lower consumer spending.

Debt, Deleveraging and Their Implications for the Recovery

The unusual weakness of the current recovery stems from the excessive leverage accumulated during the pre-crisis period, especially by U.S. households

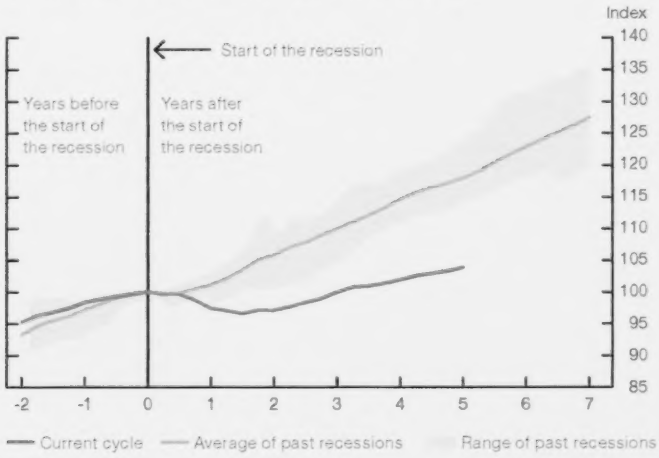
The unusual weakness of the current recovery stems from the excessive leverage accumulated during the pre-crisis period, especially by U.S. households. The buildup of leverage is directly related to the observed global imbalances (Bernanke 2011; Carney 2011a). The combination of expansionary monetary and fiscal policies in advanced economies following the 2001 recession, together with undervalued exchange rates and high savings rates in some emerging-market economies, led to massive capital flows and large global current account imbalances.[7] The United States, in particular, ran a large and persistent current account deficit during the pre-crisis period, since some emerging-market economies resisted appreciation of their currencies by accumulating substantial U.S.-dollar reserves. These large inflows of foreign savings contributed to very low, long-term interest

6 Unlike consumption and residential investment, business investment has grown at an above-average pace after hitting its trough in 2009. Still, given the severity of the correction observed in that sector during the Great Recession, business investment has yet to recover its pre-recession peak. The high level of global uncertainty and the significant slack remaining in the economy are important factors restraining business investment.

7 Studies show that a persistent deterioration in the current account appears to increase the probability of a financial crisis (Reinhart and Rogoff 2008).

Chart 4: Personal consumption

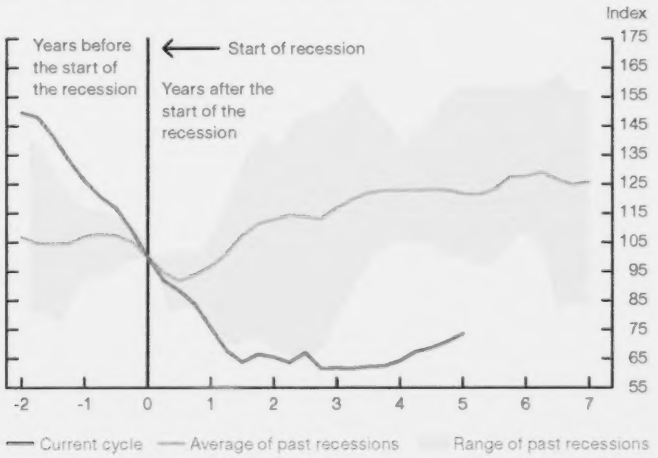
Indexed to 100 at pre-recession peak of GDP, quarterly data



Sources: U.S. Bureau of Economic Analysis and Bank of Canada calculations Last observation: 2012Q4

Chart 5: Residential investment

Indexed to 100 at pre-recession peak of GDP, quarterly data



Sources: U.S. Bureau of Economic Analysis and Bank of Canada calculations Last observation: 2012Q4

rates, and the surplus of available funds fostered intense competition for borrowers, which led to cheap credit, significantly looser lending standards and excessive leverage. Indeed, these savings inflows exposed and exploited the weaknesses in the U.S. regulatory and supervisory framework. The increased flow of foreign capital pushed down the yield on Treasury bonds and other fixed-income securities classified as low risk, leading investors to consider alternative investments in a broad search for yield.[8]

8 Investors substituted government bonds with mortgage-backed securities and other complex financial instruments that pooled together individual loans. Many of these securities were initially seen as relatively safe investments (i.e., with AAA ratings). Mortgage lenders were able to underwrite risky subprime loans and insulate themselves from the associated risk by securitizing these mortgages, i.e., packaging them into complex financial securities and selling them. Partly as a result of the moral hazard problem inherent in the securitization process, numerous bad loans were issued, causing these mortgage-backed securities to be much riskier than market participants had originally anticipated.

In most cases, these funds were not directed toward investments that would increase the productive capacity of the economy, but toward housing and consumption as households took on more debt, leaving their balance sheets vulnerable and house prices at unsustainable levels.[9] This is not uncommon: research has shown that capital inflows are often correlated with house prices (Sá, Towbin and Wieladek 2011).

Household sector

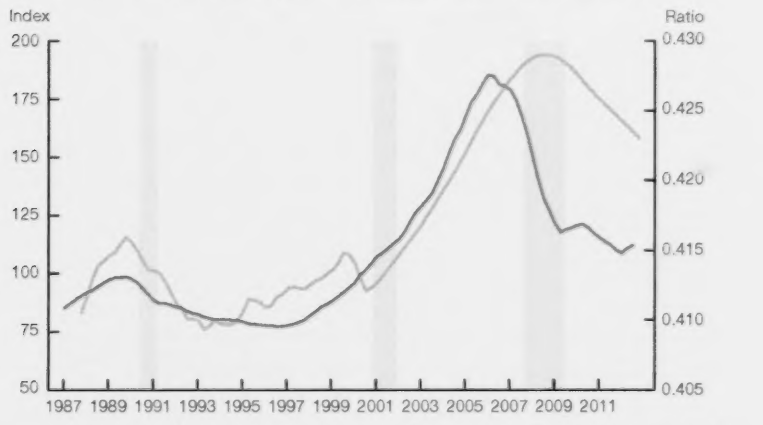
Before the Great Recession, cheap and readily available credit led to stronger demand for real estate assets

Before the Great Recession, cheap and readily available credit led to stronger demand for real estate assets. This demand contributed to a significant appreciation in real house prices—by roughly 90 per cent from early 2000 to their peak in the first quarter of 2006 (**Chart 6**), which represented the highest level of real U.S. house prices in the postwar period.

The increasing value of real estate assets reinforced the leverage cycle, since households had to take on more debt to finance real estate purchases. Furthermore, as overvalued real estate assets boosted household net worth, consumers were borrowing against the value of their homes to increase their consumption of other goods, resulting in additional leverage through home-equity lines of credit. Mian and Sufi (2010) find that, from 2002 to 2006, homeowners borrowed between 25 cents and 30 cents per dollar against the rising value of their home equity, and argue that this credit was likely used primarily for real outlays rather than to pay down debt subject to higher interest rates. Holdings of mortgage debt increased by about US$5.7 trillion between 2000 and 2007; as a result, the household debt-to-income ratio increased by roughly 0.45, peaking at 1.64 (**Chart 7**).[10] As Carney (2011b) notes, "complacency among individuals and institutions, fed by a long period of macroeconomic stability and rising asset prices, made this remorseless borrowing seem sensible."

Chart 6: Real house prices and the ratio of housing stock to population

Total housing stock over resident population (4-quarter moving average); real S&P/Case-Shiller home price index deflated with personal consumption expenditure, 2000 = 100, quarterly data



Note: The shaded areas indicate recession periods.

Sources: U.S. Census Bureau, U.S. Bureau of Economic Analysis, Standard & Poor's, Haver Analytics and Bank of Canada calculations

Last observations: real house prices, 2012Q3; housing stock/population, 2012Q4

9 Highly developed mortgage markets with an abundance of securitization, as well as competitive banking sectors, such as those in the United States, strengthen these links through the financial-accelerator mechanism, in which negative financial market shocks restrain economic growth through a self-reinforcing adverse feedback loop.

10 The U.S. household debt-to-income ratio is calculated to be consistent with the Canadian definition.

Chart 7: **Ratio of household debt to disposable income and personal savings rate**

Quarterly data

Note: The shaded areas indicate recession periods. The ratio of U.S. debt to disposable income includes the unincorporated business sector.

Sources: U.S. Bureau of Economic Analysis and Federal Reserve Board

Last observations: savings rate, 2012Q4; debt-to-income ratio, 2012Q3

Deterioration of household balance sheets

Despite the massive accumulation of debt, the ratio of household debt to assets was relatively stable, since both house prices and stock prices were increasing significantly, masking the growing vulnerability of household balance sheets. Nominal house prices started declining in 2006, and by the autumn of 2007, it had become clear to global investors that risk in the U.S. subprime mortgage market had been mispriced and there was considerable excess supply in the housing market (**Chart 6**). Investor demand for mortgage-backed securities collapsed, restraining the supply of funds at financial institutions. House prices fell sharply and mortgage defaults and foreclosures rose rapidly. From its peak of about US$67 trillion in the third quarter of 2007, household wealth decreased by 24 per cent to a trough of US$51 trillion in the first quarter of 2009. Consequently, household net worth as a share of disposable income experienced its largest drop in the postwar era, reaching its lowest level since 1992 (**Chart 8**).

Fear of future defaults and foreclosures led to a sharp contraction in interbank lending and an extreme tightening of lending standards

The severe repricing of risk and the opacity associated with complex financial instruments backed by mortgages led to concerns about the potential exposure of banks to these risky assets. Fear of future defaults and foreclosures led to a sharp contraction in interbank lending and an extreme tightening of lending standards for both consumers and businesses. The United States suffered a severe credit crunch that resulted in the deterioration in macroeconomic conditions, which amplified the number of foreclosures, leading to an adverse feedback loop between the real economy and the financial sector.

The household deleveraging process

Households have been forced to delever in an effort to repair their balance sheets

Households have been forced to delever in an effort to repair their balance sheets, because (i) they accumulated an unsustainable amount of debt (**Chart 7**) and (ii) they needed to rebuild some of their unprecedented loss of wealth (**Chart 8**).

Chart 8: **Ratio of household net worth to disposable income**

Quarterly data

Note: The shaded areas indicate recession periods.

Sources: Federal Reserve Board and U.S. Bureau of Economic Analysis Last observation: 2012Q3

The level of nominal household debt in the United States has experienced unprecedented declines since 2009 (**Chart 9**), driven by a mixture of debt payments and defaults, principally on mortgages.[11] It is difficult to determine an optimal level for household debt; however, relative to disposable income, the current ratio of roughly 140 per cent remains historically high, despite a decline of about 25 percentage points since its peak. While this decline represents significant progress in the deleveraging process, deleveraging is expected to further dampen household spending.

The loss of net worth experienced by households during the Great Recession can be recovered through a combination of increased savings (used to pay down debt or acquire new assets) and rising prices for houses and financial assets. While the value of financial assets has rebounded since the Great Recession, the level of house prices remains depressed.[12] Thus, households have sharply increased their savings, which has depressed consumption (**Chart 7**).[13] In addition to compensating for the loss of wealth, the rise in savings reflects several other factors, such as households taking precautionary measures against future shocks, as well as banks' unwillingness to make loans (this is consistent with the observed sharp decline in consumption of durable goods during the recession, which was heavily driven by the availability of credit). Historically, highly indebted households will cut consumption more than less-indebted households, given the same decline in house prices. For example, Dynan (2012) finds that the extent of a household's leverage will affect consumption above and beyond a household's usual reaction to a change in wealth. Overall, there was negative growth in consumption for seven quarters since 2007, with a decline of roughly 3.4 per cent peak to trough, the largest in the postwar era (**Chart 4**). Moreover, since the end of the recession, consumption growth has averaged only 2.1 per cent. Jordà, Schularick and Taylor (2011) suggest that private deleveraging will reduce GDP growth by roughly 0.75 percentage points over the 2012–14 period.

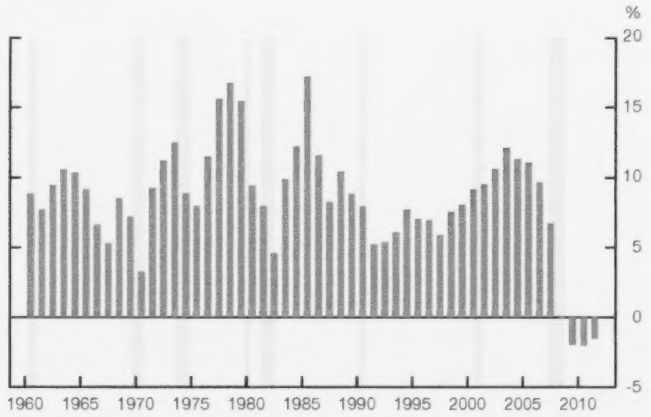
11 McKinsey Global Institute (2010) estimates that two-thirds of the decline in household debt has been driven by defaults, and one-third by households paying down their debt.

12 Total household assets currently comprise one-third real estate assets and two-thirds financial assets.

13 The level of the savings rate, however, remains low relative to the average from 1960 to 1980.

Chart 9: **Growth in nominal household debt in the United States**

Annual data



Note: The shaded areas indicate recession periods.

Source: Federal Reserve Board

Last observation: 2011

The future behaviour of asset prices, particularly house prices, will significantly influence the extent of deleveraging necessary for households to recover their desired net worth, since a robust recovery in real estate prices could limit the need for future deleveraging. On the other hand, public sector deleveraging, resulting in both higher taxes and lower government expenditures (including direct transfers to households), is expected to restrain the incomes of households and growth in GDP.

The lingering drag from a depressed housing sector

Modern U.S. recessions have often been the result of monetary policy tightening undertaken with the objective of reducing inflation (or keeping it under control). This policy tightening frequently resulted in a weak housing market; however, as monetary policy normalized, the economy benefited from a strong rebound in the housing sector and the positive wealth effect associated with increases in house prices. Multiplier effects amplify the positive impact on growth in GDP because of the purchase of goods and services associated with buying a home.

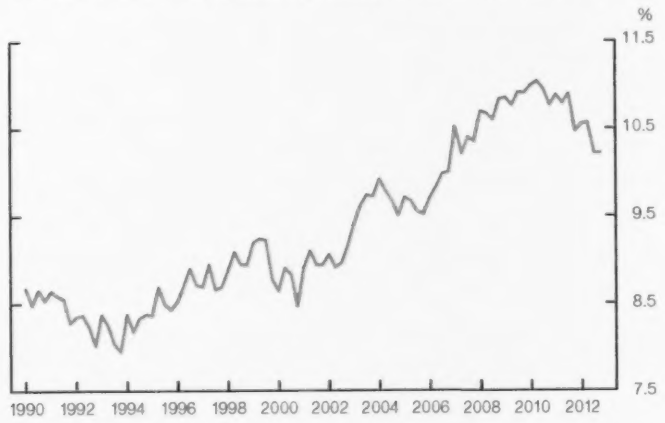
But this recovery is different. Unlike many previous U.S. recoveries, GDP growth continues to be restrained by ongoing weakness in the housing sector, since the initial negative shock largely originated in the housing market and not from restrictive monetary policy. Although some improvement in the real estate sector has been observed in recent quarters, the level of residential investment is half of its pre-recession peak and house prices remain depressed. Many factors related to the causes of the financial crisis will continue to put downward pressure on the housing market and the economy.[14]

The current recovery was slowed by extraordinarily tight lending standards and credit rationing that obstructed the issuance of mortgage debt, despite low interest rates. In addition, a large percentage of borrowers (more than 20 per cent, according to CoreLogic) still have mortgages that exceed the

14 An indirect effect of the depressed housing sector was observed at the state and local government levels. Declines in house prices have reduced government revenues and contributed to the elimination of roughly 700,000 state and local government jobs. In recent quarters, however, this sector has stabilized and should not constitute a significant drag on growth.

Chart 10: Vacant housing units in the United States

Year-round vacant housing units as a percentage of total units, quarterly data



Sources: U.S. Census Bureau and Bank of Canada calculations Last observation: 2012Q4

current market value of their homes. These negative-equity positions (often described as being "underwater") make it difficult for households to sell their homes or refinance their existing mortgages to take advantage of low interest rates. Also, many households that defaulted on their mortgages will be shut out of the housing market for years.

Oversupply in the housing sector is another important factor restraining growth

Oversupply in the housing sector is another important factor restraining growth. Before the financial crisis, the appreciation of real house prices coincided with a surge in building activity: between 2002 and 2006, housing starts averaged close to two million units annually, a level that surpassed the rate of household formation. This overbuilding, combined with the still-elevated stock of foreclosed homes, led to the significant oversupply. While progress has been made, housing-unit vacancies remain elevated from a historical perspective (**Chart 10**). This vacancy rate diminishes the need for new housing investment and will continue to put some downward pressure on prices in the near future.

Firms

Financial firms

As previously discussed, the U.S. financial sector played a crucial role in the recent crisis, enabling the rapid increase in household leverage. The subsequent deleveraging of financial firms has also had an impact on the recession and recovery.

Before the crisis, financial firms increased their leverage by relying more and more on short-term market funding and less on deposits to finance their household credit operations. Similar to the situation observed in the household sector, because of a false assessment of asset quality and the growing shadow banking sector, based on their debt-to-asset ratios, U.S. commercial banks did not appear to be overly leveraged going into the financial crisis. During the crisis, however, the massive charge-offs associated with the deterioration of U.S. residential mortgages led to large capital losses for the financial system. Severe risk aversion and elevated estimates of counterparty risk resulted in a freezing of bank funding markets and a significant credit crunch, as rapid deleveraging took place in the financial sector.

A coordinated policy response to (i) inject capital into major financial institutions and (ii) provide liquidity as needed helped to alleviate pressure on the financial sector, partly reducing the need to shed assets and limiting further harm to the real economy. Without this response, the financial industry and the supply of loans would have contracted even more severely, resulting in a deeper and more severe recession. While U.S. banks have increased their capital substantially in recent years, various factors—including persistently elevated default rates, a congested foreclosure pipeline and uncertainty surrounding future house prices—continue to hold back the flows of mortgage debt typically seen during recoveries. More than four years after the collapse of this market, private-label mortgage securitization remains virtually non-existent. In general, however, the deleveraging process of financial firms is well advanced, and there are signs that lenders are increasing the supply of consumer credit, particularly for auto loans and other big-ticket consumer expenses.[15]

A coordinated policy response helped to alleviate pressure on the financial sector

Non-financial firms

In sharp contrast to the debt held by households and financial firms, the level of non-financial business debt did not increase materially before the Great Recession, and therefore only a modest adjustment over the deleveraging cycle was required. In fact, growth in business debt in 2012 was roughly in line with its average over the past 20 years. Moreover, other financial metrics, such as the non-financial corporate quick ratio, which is a measure of liquidity, suggest that balance sheets are in relatively good shape. Overall, deleveraging in this sector is unlikely to be a significant drag on GDP growth.[16] While total business investment remains weak relative to previous recoveries, this is mainly the endogenous response to weaker aggregate demand and elevated uncertainty, rather than the need for non-financial businesses to delever.

The government sector

As households deleveraged and private demand collapsed in the United States, the government sector played an important role in supporting aggregate demand by taking on more leverage. Fiscal stabilizers increased significantly during the recession, reflecting both a drop in tax receipts and increases in transfer payments, including unemployment insurance benefits, the Supplemental Nutrition Assistance Program and Medicaid. In addition, as the financial crisis intensified, important fiscal stimulus programs were enacted. For example, the American Recovery and Reinvestment Act, passed in February 2009, included direct spending on infrastructure and education, various tax incentives and the extension of unemployment benefits.

The government sector played an important role in supporting aggregate demand by taking on more leverage

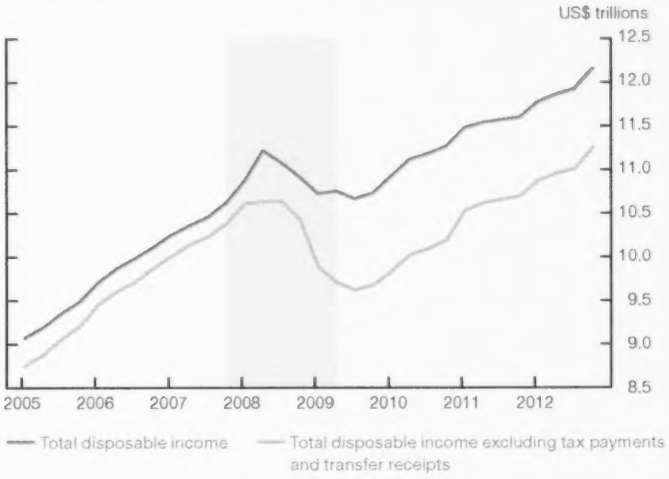
The government intervention significantly supported personal disposable income (**Chart 11**). Without the sharp increase in transfer payments and numerous tax breaks, the negative shock to household finances, consumption and the overall U.S. economy would have been much greater.

15 As of January 2013, the Federal Reserve's Senior Loan Officer Opinion Survey on Bank Lending Practices suggests an easing of credit standards across a number of industries.

16 One exception is the commercial real estate (CRE) sector, which has traditionally featured higher leverage ratios. Before the Great Recession, credit availability and relaxed underwriting standards contributed to a temporary surge in commercial property prices and the corresponding mortgage debt. Deleveraging of the CRE sector has restrained activity during the recession and over the recovery thus far.

Chart 11: Total personal disposable income and income excluding tax payments and transfer receipts

Quarterly data



Note: The shaded area indicates the range of the 2007Q4–2009Q2 recession.

Source: U.S. Bureau of Economic Analysis Last observation: 2012Q4

Chart 12: U.S. government budget balance as a percentage of GDP

Annual data

Sources: Congressional Budget Office and U.S. Bureau of Economic Analysis Last observation: 2011

The downside of this significant public support is the large increase in government deficit and debt. The ratio of federal deficit to GDP, which averaged about 2.5 per cent in the three years leading up to the recession, peaked at 10 per cent of GDP in 2009, another postwar high (**Chart 12**). The Congressional Budget Office has estimated that the federal public debt reached 73 per cent of GDP in 2012, double its pre-recession level. As households delever, the government has taken on more debt, leaving the total debt-to-GDP ratio relatively unchanged.

With the federal debt in the United States now following an unsustainable trajectory, significant adjustments to public spending and revenue will be necessary, and the public sector deleveraging process will exert a drag on the economy for years to come.

◂ *Significant adjustments to public spending and revenue will be necessary*

Conclusion

The U.S. recovery from the financial crisis has been disappointingly slow relative to other U.S. recoveries. Many factors have played a role. The ongoing crisis in Europe and the debate around U.S. fiscal policy have undoubtedly increased the level of uncertainty and reduced the pace of economic activity. In addition, policies that have prevented the rotation of demand between surplus and deficit countries have likely prevented a more robust recovery in U.S. exports. Household deleveraging, however, has been the most important factor holding back the recovery. The government sector, which helped to sustain aggregate demand in recent years, now needs to deleverage as well. The impact of this public sector and private sector deleveraging will be felt over the coming years, suggesting that the U.S. economy is likely to remain on a moderate growth path for some time. Given Canada's close real and financial linkages with the United States, the weak U.S. recovery contributed to the slow rebound in Canadian exports. Looking forward, the moderate growth path of U.S. GDP projected in the January 2013 *Monetary Policy Report* will continue to have important implications for the Canadian economy and monetary policy.

Literature Cited

Bernanke, B. S. 2011. "International Capital Flows and the Returns to Safe Assets in the United States, 2003–2007." Banque de France *Financial Stability Review* 15 (February): 13–26.

Carney, M. 2011a. "Global Imbalances: The International Monetary System and Financial Stability." Banque de France *Financial Stability Review* 15 (February): 31–38.

———. 2011b. "Growth in the Age of Deleveraging." Speech to the Empire Club of Canada/Canadian Club of Toronto, Toronto, Ontario, 12 December.

Dynan, K. 2012. "Is a Household Debt Overhang Holding Back Consumption?" Brookings Institution. Available at www.brookings.edu/~/media/Files/Programs/ES/BPEA/2012_spring_bpea_papers/2012_spring_BPEA_dynan.pdf.

Gordon, R. J. and R. Krenn. 2010. "The End of the Great Depression 1939–41: Policy Contributions and Fiscal Multipliers." National Bureau of Economic Research Working Paper No. 16380.

Howard, G., R. Martin and B. A. Wilson. 2011. "Are Recoveries from Banking and Financial Crises Really So Different?" Board of Governors of the Federal Reserve System International Finance Discussion Paper No. 1037.

International Monetary Fund (IMF). 2012. "Coping with High Debt and Sluggish Growth." *World Economic Outlook* (October).

Jordà O., M. H. P. Schularick and A. M. Taylor. 2011. "When Credit Bites Back: Leverage, Business Cycles, and Crises." National Bureau of Economic Research Working Paper No. 17621.

Kozicki, S., E. Santor and L. Suchanek. 2011. "Unconventional Monetary Policy: The International Experience with Central Bank Asset Purchases." *Bank of Canada Review* (Spring): 13–25.

McKinsey Global Institute. 2010. "Debt and Deleveraging: The Global Credit Bubble and Its Economic Consequences." Available at www.mckinsey.com/insights/mgi/research/financial_markets/debt_and_deleveraging_the_global_credit_bubble_update.

Mian, A. and A. Sufi. 2010. "The Great Recession: Lessons from Microeconomic Data." *American Economic Review* 100 (2): 51–56.

Reinhart, C. M. and K. S. Rogoff. 2008. "Is the 2007 U.S. Sub-Prime Financial Crisis So Different? An International Historical Comparison." *American Economic Review* 98 (2): 339–44.

———. 2012. "This Time Is Different, Again? The U.S. Five Years After the Onset of Subprime." (22 October). Available at www.voxeu.org/article/time-different-again-us-five-years-after-onset-subprime-0.

Sá, F., P. Towbin and T. Wieladek. 2011. "Low Interest Rates and Housing Booms: The Role of Capital Inflows, Monetary Policy and Financial Innovation." Bank of England Working Paper No. 411.

Conference Summary: Financial Intermediation and Vulnerabilities

Jason Allen, James Chapman and Ian Christensen, Financial Stability Department

The Bank of Canada's annual economic conference, held in October 2012, brought together experts from around the world to discuss key issues concerning financial intermediation and vulnerabilities. The conference covered such topics as household finances and their relationship to financial stability, as well as bank regulation and shadow banking, including securitization and the regulatory perimeter.

Before the 2007–09 financial crisis, economic research traditionally focused on the relationships between households and businesses, and the entities (financial institutions) that act as intermediaries between savers and borrowers through activities on their balance sheets. The crisis, however, revealed that our perception of these relationships was overly simplistic.

We have had to reconsider how the financial system channels funds from savers to borrowers. In particular, more research is required to understand the traditional banking sector, as well as the market-based finance sector (i.e., the shadow banking system), and how both these sectors create links that redistribute risks through the financial system. The Bank of Canada's annual conference was organized to help analyze this process and the potential impact it has on households.

Households are central to the health of the Canadian economy. Their financial well-being has important implications for the stability of the financial sector, first in their ability to meet their financial obligations, and second through changes in the value of their most valuable asset—their homes. Understanding how changes to bank funding, in particular, the securitization market for mortgage-backed securities, can affect household borrowing and how household balance-sheet vulnerabilities can affect bank riskiness are therefore important areas of research.

The Bank of Canada's 2012 economic conference comprised six sessions, including a keynote address, as well as the John Kuszczak Memorial Lecture and a panel discussion. This article summarizes the papers presented and the discussions that followed.

The *Bank of Canada Review* is published four times a year. Articles undergo a thorough review process. The views expressed in the articles are those of the authors and do not necessarily reflect the views of the Bank. The contents of the *Review* may be reproduced or quoted, provided that the publication, with its date, is specifically cited as the source.

Session 1: A New Era in Banking

Sir John Vickers (All Souls College, University of Oxford) opened the conference with a broad discussion of banking after the recent financial crisis. Vickers chaired the U.K. Independent Commission on Banking (ICB), which developed proposals to reform the U.K. banking sector. In his presentation, "Some Economics of Banking Reform," Vickers discussed the main recommendations of the ICB. First, it advocates the separation of a bank's retail-banking activity from its investment-banking activity (i.e., ring-fencing) to protect the safer retail services from the riskier investment-banking activities. Second, to increase the ability of banks to absorb losses if there is a negative shock, the ICB recommends that banks issue additional equity and loss-absorbing debt. The goal of these proposals is to shift risk away from retail depositors (and taxpayers) and toward investors so that banks would not be able to subsidize riskier investment activity with depositor funding, and to insulate retail banking from a failure of the investment-banking arm.

In the discussion that followed Vickers' presentation, questions were raised about whether this ring-fenced insulation would reduce the "too-big-to-fail" problem. Vickers repeated his view that the proposed initiatives would increase financial stability, and argued that this benefit more than offsets the ICB estimates of the costs to U.K. banks of the ring-fencing and loss-absorbency measures (£4 billion to £7 billion per year). Vickers pointed to the Liikanen report,[1] which proposes reforms to increase financial stability throughout Europe and includes recommendations similar to those of the ICB. However, the Liikanen report recommends ring-fencing proprietary and third-party trading activities, rather than the retail bank.

Session 2: Consumer-Risk Models

Following the collapse of the U.S. housing market, there has been a keen interest in explaining the boom and bust of the market, and exploring alternative housing and mortgage policies for leaning against housing bubbles. In their paper "Real Estate Investors and the Boom and Bust of the U.S. Housing Market," presenter **Wenli Li** (Federal Reserve Bank of Philadelphia) and co-author **Zhenyu Gao** (Princeton University) explore the role of mortgage borrowers for investment purposes (defined as purchasers of second homes). The authors' empirical results show that the amount of investor activity is sensitive to house-price expectations and credit constraints. Real estate investors can therefore amplify housing cycles, and the relaxation of mortgage-lending guidelines can exacerbate the problem.

In his comments, **Césaire Meh** (Bank of Canada) highlighted the significance of real estate investors and documented the extent of their leverage as well as the "type" of investor they are. Interestingly, before the financial crisis, investment-motivated homeowners in the United States were less leveraged than owner-occupied homeowners and were more likely to be high-income borrowers with prime mortgages. Meh noted that Li and Gao's results imply that policies such as increasing the amount of down payment required to qualify for mortgage insurance for investment properties will reduce investor activity and therefore dampen cycles in house prices. However, if investors tend to have large down payments for the purchase of properties (and therefore do not typically rely on mortgage insurance), such policies would have only a limited effect on investor demand. Similarly, **Derek Stacey**

1 Also known as the report of the European Commission's High-level Expert Group on Reforming the Structure of the E.U. Banking Sector, the Liikanen report was prepared by the European Commission Expert Group chaired by the Governor of the Bank of Finland, Erkki Liikanen.

(Ryerson University) noted that the role of real estate investors would increase if lenders relaxed mortgage lending standards, since, as shown in Li and Gao's model, the interaction of growth in house prices and demand for investment properties relies on the transaction costs for "flipping" investment houses being cheaper than buying and selling owner-occupied houses.

In his paper "Continuous Workout Mortgages in a Structural Model of Housing and Mortgage Markets," **Edward Kung** (University of California, Los Angeles) analyzes the welfare implications of different types of mortgage contracts. He shows that contracts in which house-price risk is shared by both the borrower and lender—continuous workout mortgages—can improve the efficiency of the mortgage and housing market. For example, if the lender takes on some of the risk in the depreciation of house prices but can also share in the capital gains, then consumer welfare increases. Such a mortgage design can also increase financial stability, since homeowners do not absorb the entire cost of the house-price depreciation and are, therefore, less likely to default. Variations of continuous workout mortgages have been proposed by Caplin et al. (2007); Caplin, Cunningham and Engler (2009); and Shiller (2008; 2009).

In his discussion, **Tom Davidoff** (Sauder School of Business, University of British Columbia) did not agree with Kung's findings, arguing that if homeowners wanted to hedge their house-price risk, they could buy Case-Shiller securities or a reverse mortgage. The empirical evidence suggests that homeowners do not take short positions on home prices.

Jim MacGee (University of Western Ontario) was impressed with the goal of using a structural model to analyze questions of mortgage innovation; however, he agreed with Davidoff on the probable unpopularity of such a mortgage. MacGee noted the potential for moral hazard with continuous workout mortgages; that is, since the lender shares some of the house-price risk but doesn't share in the upkeep of the home or the timing of the decision to sell, the borrower could take actions that lower returns for the lender.

Session 3: Household Vulnerabilities

With their ratios of debt to disposable income now averaging 165 per cent, Canadian households are increasingly vulnerable to movements in interest rates, negative income shocks and lower house prices.

In their paper "What Explains High Unemployment? The Aggregate Demand Channel," **Atif Mian** (University of California, Berkeley) and presenter **Amir Sufi** (University of Chicago Booth School of Business) explain how a negative shock to household balance sheets, resulting from a decline in house prices, for example, leads to lower aggregate demand and higher unemployment. Using county-level employment data and classifying industries as tradable or non-tradable, the authors find that the most highly leveraged counties experienced the sharpest declines in demand following the financial crisis (Mian, Rao and Sufi 2011), and that these counties also suffered the largest job losses in the non-tradable sector. Consistent with the aggregate demand channel, in which demand for traded goods declines everywhere, Mian and Sufi (2012) find that employment losses in the tradable sector do not correlate with household leverage in U.S. counties. The authors estimate that the aggregate demand channel can account for 65 per cent of the total loss in U.S. employment from March 2007 to March 2009.

In her discussion, **Katsiaryna Kartashova** (Bank of Canada) provided robustness analysis of the paper's results, exploiting data available at the U.S. state level, including on consumer expenditures, and confirmed patterns reported by the authors. She also showed that bank lending played a role in explaining the loss of employment in the United States after 2007. Kartashova found that a slowdown in bank lending affected employment in the non-tradable sector, not only as a result of lower demand for borrowing associated with household balance sheets (as in Mian and Sufi 2012), but also because of bank balance-sheet effects, thus amplifying Mian and Sufi's results.

Rui Castro (Université de Montréal) focused on an alternative hypothesis for the increase in unemployment in the non-tradable sector—that it was a sector-specific shock. Since most non-tradable firms are small (e.g., restaurants), and most tradable firms are large (e.g., auto manufacturers), non-tradable firms rely more on bank lending. Castro argued that these smaller firms were therefore affected by a credit crunch in the most leveraged counties. Given the importance of household leverage in today's economy, the audience had a lengthy discussion of this research.

In their paper "Consumer Bankruptcy and Information," **Jason Allen** (Bank of Canada), presenter **Evren Damar** (Bank of Canada) and **David Martinez-Miera** (Carlos III University) examine the factors that have contributed to the rise in household insolvency during the past two decades. Drawing on an administrative database of Canadian bankruptcy filings, the authors document substantial variation in bankruptcy rates over time and across neighbourhoods. Their main hypothesis is that the observed patterns in bankruptcy rates across different neighbourhoods can be partially explained by the role of bank branches and the relationship between creditors and debtors at the local level. The key empirical finding is that banks that approve more loans per branch experience more client bankruptcies. One explanation is that these banks use soft information less intensively because of their inability to form substantial relationships with each of their many borrowers. This finding has important policy implications, since it implies that hard information (credit scoring) cannot fully replace the type of information gathered at local branches through personal contact.

Discussants **Reint Gropp** (Goethe University) and **Emre Ergungor** (Federal Reserve Bank of Cleveland) analyzed the two mechanisms used in the paper: (i) bank mergers and the reallocation of lenders across branches, and (ii) a regression of the use of soft information on consumer bankruptcies. Both discussants agreed that the first mechanism was a more convincing explanation of the bank branch-bankruptcy relationship. Ergungor argued that branch divestiture is often an important issue in the United States and should be part of the formal analysis. Gropp raised the issues of the potential social welfare impact of branch closures, as well as the socially optimal level of bankruptcy.

Session 4: Financial Intermediation and Asset Prices

In the keynote address "Capital Flows and the Risk-Taking Channel of Monetary Policy," presenter **Hyun Song Shin** (Princeton University) and co-author **Valentina Bruno** (Kogod School of Business, American University) highlight the importance of global liquidity conditions for domestic credit. In a world with global banks, low interest rates decrease the costs of bank funding and therefore increase the supply of credit. They also increase risk taking. The authors argue that even as banks take on more risk, measures of risk taking appear to decline during normal times, and this leads to even more cross-border banking flows and more risk taking by banks. There is,

the authors conclude, an interplay between risk taking and measured risks. The key amplification channel that Bruno and Shin examine is the effect that increased risk taking has on currency appreciation through rising capital flows. These capital flows decrease the measured volatility (i.e., perceived risk) of bank assets, which in turn leads to more capital flows as banks seek to target a particular level of risk taking.

In his discussion of Bruno and Shin's analysis, **Guillaume Plantin** (Toulouse School of Economics–Institut d'Économie Industrielle) noted that the main mechanism in the paper is the failure of uncovered interest rate parity (UIP)[2] to hold—that is, low interest rate currencies tend to depreciate, rather than appreciate, as dictated by UIP. Empirically, UIP tends to be rejected by the data; however, economists have not been able to explain this rejection. This issue is of course troubling for economists, and a lot of recent research has focused on it.[3]

Session 5: Financial Innovation, Shadow Banking and the Prudential Perimeter

The Financial Stability Board (FSB) broadly describes shadow banking as "credit intermediation involving entities and activities outside the regular banking system" (FSB 2011). The shadow banking sector was at the centre of the 2007–09 financial crisis because of its poor securitization practices and its greater reliance on less-stable funding, and because of its use by traditional banks for similarly less-stable wholesale funding. These funding markets were largely based on securitization markets such as the market for asset-backed commercial paper (ABCP) and asset-backed securities. To address this problem, the Basel Committee on Banking Supervision (BCBS) called in 2009 for proposals to strengthen liquidity requirements to promote the resilience of the financial sector.[4]

In their paper "A Theory of Bank Liquidity Requirements," presenter **Charles Calomiris** (Columbia University), **Florian Heider** (European Central Bank) and **Marie Hoerova** (European Central Bank) take up the BCBS call with an in-depth analysis of liquidity requirements. Using a model where capital requirements and liquidity requirements interact, the authors determine the optimal mix of these requirements under a number of scenarios. Cash plays an important role, because it mitigates liquidity risk and encourages greater risk management. Since deposit insurance reduces the incentives for banks to monitor each other, the government could require banks to hold more cash to achieve the same level of risk as in an environment without deposit insurance.

Discussant **David Martinez-Miera** (Carlos III University) appreciated the authors' message regarding the dual role of cash—to mitigate both liquidity risk and insolvency risk. His concern was that higher cash requirements might reduce the charter value of banks,[5] which would in fact increase insolvency risk, not decrease it. This effect could reduce a bank's incentive to preserve its charter and therefore cause it to pursue more risky short-term investments.

2 Uncovered interest rate parity asserts that the difference in interest rates between two countries is equal to the expected change in their exchange rates.

3 For example, see Alvarez, Atkeson and Kehoe (2007) and Obstfeld and Rogoff (2000).

4 See www.bis.org/press/p091217.htm.

5 The charter value of a bank is the value to shareholders of the bank's future discounted net profits.

Francesco Trebbi (University of British Columbia) initiated an extended discussion about the paradox of liquidity (Myers and Rajan 1998); that is, since cash is liquid and easy to shift around, it reduces a bank's commitment to a specific course of action. More cash provides bank managers with greater freedom to behave in a manner that is inconsistent with what the bank's shareholders or a regulator would want. Trebbi concluded that liquidity requirements are more subtle than they first appear and more work should be done to understand their potential drawbacks.

In their paper entitled "Covered Bonds and Systemic Risk," **Kartik Anand** (Bank of Canada), presenter **James Chapman** (Bank of Canada) and **Prasanna Gai** (University of Auckland) examine the financial stability implications of covered bonds, i.e., bonds secured by a pool of high-quality, ring-fenced assets that stay on a bank's balance sheet. In their model, banks are constrained in the amount of covered bonds they can issue by a limit on encumbrance. The authors conduct an experiment where the ring-fenced assets are impaired and the bank has to readjust the amount of assets inside and outside the ring fence. This readjustment makes depositors prone to run, since it causes the impairment of assets to be borne entirely by the unsecured creditors. When returns are high, increasing allowable encumbrance can decrease systemic risk because of the rise in investment opportunities. When returns are low, increasing allowable encumbrance can increase systemic risk because of the effect it has on the rollover decisions of unsecured depositors. The model implies that limits on encumbrance should be dynamic rather than static. It also implies that there is a role for central banks to support the secondary market for covered bonds by swapping "bad" collateral for "good," both during a systemic crisis and in normal times.

Both discussants, **Douglas Gale** (New York University) and **Rodney Garratt** (University of California, Santa Barbara), were intrigued by the role of covered bonds in financial stability. They argued that, while the results appear to be sensible, the authors should relax some of the modelling assumptions. In particular, they noted that, since this is the first paper to look at the incentive aspects of covered bonds, the authors should focus only on ring-fencing, rather than attempt to model both the issuance of covered bonds and their trading in secondary markets.

Session 6: Regulating Systemic-Risk Externalities

The papers in this session provided retrospective analyses of shadow banking crises. In "Responding to a Shadow Banking Crisis: The Lessons of 1763," presenter **William Roberds** (Federal Reserve Bank of Atlanta) and co-author **Stephen Quinn** (Texas Christian University) analyze the collapse of the merchant bank De Neufville in 1763, and its impact on other merchant banks and on the Bank of Amsterdam. They then compare this episode with the collapse of Lehman Brothers in 2008. There are many similarities: (i) both banks were involved in securitization; (ii) both faced rollover risk; and (iii) in both cases, the central bank provided loans to the securitizers and emergency facilities. Unlike with the Lehman collapse, however, the intervention of the Bank of Amsterdam led to a recovery of the Dutch market, even though De Neufville failed. The Lehman collapse was similar to the De Neufville collapse in that shocks to collateral from a shadow bank led to the failure of a leveraged institution. The Lehman collapse, however, had larger repercussions on the global economy.

Angela Redish (University of British Columbia) was impressed by the authors' collection and examination of Dutch archival data for their analysis of the 1763 banking crisis, although she wanted the authors to draw more lessons and policy implications from their analysis. For example, could stress testing have flagged the incipient collapse? Could higher capital or liquidity requirements have helped?

Olivier Accominotti (London School of Economics and Political Science) commented that the archival work of the authors should lead to a host of research in the area of Dutch banking. Accominotti's main point was that the collapse of De Neufville might be more similar to the collapse of American International Group (AIG) than Lehman Brothers because De Neufville traded acceptances, which did not have the maturity mismatch that we saw with Lehman.

In "The Flight from Maturity," **Gary Gorton** (Yale School of Management) presented a retrospective look at the collapse of Lehman Brothers. Gorton and co-authors **Andrew Metrick** (Yale) and **Lei Xie** (Yale) argue that following the initial run in the repo market and ABCP market in early 2007, there was a buildup of risk that led to the collapse of Lehman in 2008. The mechanism for this buildup was market participants trying to create "moneyness," which involved a flight from long instruments, such as long-term debt, to short instruments (e.g., repos). The authors use econometric methods to test their hypothesis and find multiple breaks (or shifts) in the series related to the crisis. They conclude that each break was a further buildup of risk, and that the financial crisis was not the result of a single unexpected shock that brought down the entire financial system. Rather, it was symptomatic of a financial system that had become increasingly more vulnerable over time. The Lehman collapse was not a shock that kicked off the crisis, but the beginning of an inevitable realization of these vulnerabilities.

Anna Kovner (Federal Reserve Bank of New York) applauded the authors' documentation of the short-term funding positions of banks before and during the financial crisis, but wanted more. Unfortunately, many pieces of information that would be useful, for example, information on haircuts, repo volumes or over-the-counter trades, were not collected before the crisis.

Andrew Morton (Citibank) drew on his experience at Lehman during the crisis to express his agreement with Gorton that the financial crisis started before the collapse, and that there was a dynamic run-up starting with the repo shock in July 2007. From a policy perspective, therefore, there might be ways to detect these events in advance, rather than rationalizing them in hindsight. This should be the goal.

John Kuszczak Memorial Lecture

Every year since 2002, the Bank of Canada has honoured the memory of one of its own, John Kuszczak, with a guest lecture in his name. This year's speaker—**Edmund Clark** (Chief Executive Officer of TD Bank Group)—discussed the erosion of public confidence in the global banking system, and bankers in particular, since the 2007–09 financial crisis. He explored some of the reasons behind this erosion, including the ongoing European crisis, the financial mishaps of certain banks, and the fact that significant government and central bank intervention rescued some banks that continue to make large profits today with little change in their behaviour. Clark called on regulators to be steadfast in their pursuit of principles-based regulation (in contrast to strict rules-based regulation), so that financial institutions and, hence, the economy, can perform better in an environment with less regulatory uncertainty.

Panel Discussion

The conference ended with a panel discussion involving **Governor Mark Carney** (Bank of Canada), **Governor Stanley Fischer** (Bank of Israel) and **Professor Robert Kaplan** (Harvard Business School).

Governor Carney focused on the current regulatory work surrounding shadow banking, which is among the key priorities of the FSB. He argued that the shadow banking sector plays an important complementary role to the regulated banking sector in the credit-intermediation process, and that, although it should be encouraged, it should also be monitored. More broadly, Governor Carney described key initiatives undertaken by the FSB and stressed their full and consistent implementation. This implementation is essential to preserve the advantages of an open and globally integrated financial system, since market participants and authorities need to have confidence in the strength of financial institutions and markets in other countries. But Governor Carney also noted the risk that a return to a nationally segmented global financial system could reduce both financial capacity and systemic resilience, with major consequences for jobs and growth across our economies.

Governor Fischer focused his discussion on two macroprudential issues in Israel: measurement of stress and risks in the financial system, and coordination among macroprudential regulators. He highlighted the importance that central banks must now place on measuring risks (domestic and foreign, market, financial, bank, and macro), and also on how to communicate these risks.

Professor Kaplan closed off the conference by discussing the importance of leadership as we recover from the financial crisis, implement bank regulation and think about economic growth. He noted that central banks are currently taking a leadership role, but this is not enough for a strong recovery. To return to higher growth, Kaplan argued, economies in North America and Europe need more leadership from political authorities to undertake the drastic change required for prosperity.

List of Conference Papers and Literature Cited

Allen, J., H. E. Damar and D. Martinez-Miera. 2012. "Consumer Bankruptcy and Information." Bank of Canada Working Paper No. 2012-18.

Alvarez, F., A. Atkeson and P. J. Kehoe. 2007. "If Exchange Rates Are Random Walks, Then Almost Everything We Say About Monetary Policy Is Wrong." *American Economic Review* 97 (2): 339–45.

Anand, K., J. Chapman and P. Gai. 2012. "Covered Bonds and Systemic Risk."

Bruno, V. and H. S. Shin. 2012. "Capital Flows and the Risk-Taking Channel of Monetary Policy."

Calomiris, C., F. Heider and M. Hoerova. 2012. "A Theory of Bank Liquidity Requirements."

Caplin, A., J. H. Carr, F. Pollock, Z. Y. Tong, K. M. Tan and T. Thampy. 2007. "Shared-Equity Mortgages, Housing Affordability, and Homeownership." *Housing Policy Debate* 18 (1): 209–42.

Caplin, A., N. B. Cunningham and M. Engler. 2009. "Rectifying the Tax Treatment of Shared Appreciation Mortgages." *Tax Law Review* 62 (4): 505–38.

Financial Stability Board (FSB). 2011. "Shadow Banking: Strengthening Oversight and Regulation." Available at www.financialstabilityboard.org/publications/r_111027a.pdf.

Gorton, G. B., A. Metrick and L. Xie. 2012. "The Flight from Maturity."

Kung, E. C. 2012. "Continuous Workout Mortgages in a Structural Model of Housing and Mortgage Markets."

Li, W. and Z. Gao. 2012. "Real Estate Investors and the Boom and Bust of the U.S. Housing Market." Available at http://ssrn.com/abstract=2024199.

Mian, A., K. Rao and A. Sufi. 2011. "Household Balance Sheets, Consumption, and the Economic Slump." Available at http://faculty.chicagobooth.edu/amir.sufi/MianRaoSufi_EconomicSlump_Nov2011.pdf.

Mian, A. and A. Sufi. 2012. "What Explains High Unemployment? The Aggregate Demand Channel." National Bureau of Economic Research Working Paper No. 17830.

Myers, S. C. and R. G. Rajan. 1998. "The Paradox of Liquidity." *Quarterly Journal of Economics* 113 (3): 733–71.

Obstfeld, M. and K. Rogoff. 2000. "The Six Major Puzzles in International Macroeconomics: Is There a Common Cause?" National Bureau of Economic Research Working Paper No. 7777.

Roberds, W. and S. Quinn. 2012. "Responding to a Shadow Banking Crisis: The Lessons of 1763." Federal Reserve Bank of Atlanta Working Paper No. 2012-8.

Shiller, R. J. 2008. *The Subprime Solution: How Today's Global Financial Crisis Happened and What to Do About It*. Princeton, NJ: Princeton University Press.

———. 2009. "Policies to Deal with the Implosion in the Mortgage Market." *The B.E. Journal of Economic Analysis & Policy* 9 (3): Article 4.

Vickers, J. 2012. "Some Economics of Banking Reform." University of Oxford, Department of Economics Discussion Paper No. 632.